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EXAMINER

LAVILLA, MICHAEL E

ART UNIT PAPER NUMBER

1775

DATE MAILED: 03/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/649,087

Applicant(s)

CHEBIAM ET AL.

Examiner

Michael La Villa

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-21 and 31-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13, 16 and 17 is/are allowed.
- 6) ☒ Claim(s) 14, 15, 18-21 and 31-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 14, 15, 18-21, 31, 33, 34, 36, and 37 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. For the reasons given below in the section 112, second paragraph rejections, the dependent Claims 14, 15, 18-21, 31, 33, 34, 36, and 37 may be interpreted as broadening the scope of the independent Claims 13, 32, or 35, respectively, which interpretation would render the claims as improperly not further limiting.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:
3. The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.
4. Claims 35-37 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding Claims 35-37, applicant has identified possible "sM" metals as those that applicant had originally classified as "pM" metals, such as, copper and gold,

among others. It is unclear where the original Specification discloses this newly claimed subject matter or how applicant otherwise justifies antecedent support.

Applicant has not made of record applicant's reasons.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:
6. The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
7. Claim 14, 15, 18-21, 31, 33, 34, 36, and 37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
8. Regarding Claim 14, it is unclear what compositions are encompassed that include Ni, such as, "pMNiB." Since Ni is one of the "pM" elements, it is unclear what is claimed. Must another "pM" element be present? What is the range of "w" and amount of Ni that is permissible? This latter indefiniteness also applies to Claim 15.
9. Regarding Claim 18, it is unclear what compositions are encompassed by NipMB. It is unclear what compositions are encompassed that include Pd, such as, "pMPdCrB." Since Ni and Pd are among the "pM" elements, it is unclear what is claimed. Must another "pM" element be present? What is the range of "w" and amount of Ni or Pd that is permissible? This latter indefiniteness also applies to Claim 19.
10. Regarding Claim 20, it is unclear how the "pM" can include cobalt, as cobalt is not among the permissible choices for "pM."

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11. Regarding Claim 21, it is unclear how the primary metal can be selected to comprise something other than Cu, Ag, Au, Pd, Pt, Ni, Rh, and/or Ir, as set forth in Claim 13. Therefore, it is unclear what is meant by the designations MP, MW, etc. To the extent that these constitute possible overall compositions, it is unclear how they cannot be required to contain B, as all compositions must contain B. It is unclear how the so-called metal combination M can comprise cobalt, as cobalt is not among the permissible choices for "pM."
12. Regarding Claim 31, it is unclear how the compositions can comprise cobalt, since cobalt is not among the permissible choices for "pM," or any other compositional ingredient, as set forth in Claim 13. Are the claimed alloys to further comprise cobalt?
13. Regarding Claim 33, it is unclear what compositions are encompassed that include Pd, such as, "pMPdBP." Since Pd is one of the "pM" elements, it is unclear what is claimed. Must another "pM" element be present? What is the range of "w" and amount of Pd that is permissible? This latter indefiniteness also applies to Claim 34.
14. Regarding Claim 36, it is unclear what compositions are encompassed that include a specific "sM" metal, such as, "sMCoCrB." Since Cr is one of the "sM" elements, it is unclear what is claimed. Must another "sM" element be present? What is the range of "x" and amount of Cr that is permissible? This latter indefiniteness also applies to Claim 37.

Claim Rejections - 35 USC § 102

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

16. A person shall be entitled to a patent unless –

17. (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

18. Claims 32 and 34 are rejected under 35 U.S.C. 102(e) as being anticipated by

Inoue et al. USP 6,717,189. Inoue teaches applying protective electroless layers of the claimed composition over semiconductor devices with embedded interconnect structures. See Inoue (Abstract; col. 3, lines 38-56; col. 14, line 16 through col. 15, line 33). Inoue teaches applying these layers on exposed conductive materials of a semiconductor device having an embedded interconnect structure, which conductive materials may be identified with the claimed "conductive pad."

Claim Rejections - 35 USC § 103

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

20. (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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21. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

22. Determining the scope and contents of the prior art.

23. Ascertaining the differences between the prior art and the claims at issue.

24. Resolving the level of ordinary skill in the pertinent art.

25. Considering objective evidence present in the application indicating obviousness or nonobviousness.

26. Claims 32 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Inoue et al. USP 6,717,189 in view of Applicant's Admissions. Inoue

teaches applying protective electroless layers of the claimed composition over

semiconductor devices with embedded interconnect structures. See Inoue

(Abstract; col. 3, lines 38-56; col. 14, line 16 through col. 15, line 33). Inoue may

not teach applying these layers to a M6 pad. Applicant's Admissions teach that a

M6 pad may be the outer part of a semiconductor device with embedded

interconnect structure. See Applicant's Specification (pages 1, line 10 through

page 3, line 2). It would have been obvious to one of ordinary skill in the art at

the time of the invention to apply the layer of Inoue to a M6 pad as such a pad

may be an outer part of a semiconductor device having embedded interconnect

structures, which Inoue teaches may be suitably protected by the layer of Inoue.

Allowable Subject Matter

27. Claims 13, 16, and 17 are allowed.

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28. Claims that are dependent on Claim 13 and presently rejected and objected to may be allowable, provided they are amended to be properly further limiting and definite.

29. The reviewed prior art does not teach or suggest the subject matter of Claims 13, 16, and 17. Particularly, there is no teaching or suggestion of electroless plating structures on M6 Cu pads comprised of the claimed alloys, for which "pM" no longer encompasses cobalt, including those alloys specifically claimed in Claims 16 and 17.

Response to Amendment

- I. Applicant's amendment to the first line of the Specification and new claim listing overcome the informality objections to the Specification of the Office Action mailed on 6 April 2005.
- II. The objection to the Abstract of the Office Action mailed on 6 April 2005 is withdrawn.
- III. In view of applicant's amendments and arguments, applicant traverses the section 112, second paragraph rejections of the Office Action mailed on 6 April 2005. Rejections are withdrawn, but new rejections are presented above for the reasons given above.
- IV. In view of applicant's amendments and arguments, applicant traverses the claim objections of the Office Action mailed on 6 April 2005. Claim objections are withdrawn, but new claim objections are presented above for the reasons given above.

- V. In view of applicant's amendments and arguments, applicant traverses the section 103 rejection over Inoue in view of Applicant's Admissions of the Office Action mailed on 6 April 2005. Inoue is relied on for teaching cobalt alloys. Since Claim 13 has been amended so that it no longer encompasses alloys for which "pM" can be cobalt, rejections over Inoue in view of Applicant's Admissions of Claim 13 and those claims dependent on Claim 13 are withdrawn. Applicant's arguments with respect to dependent Claim 31 are not understood since the text of Claim 31 does not appear to demand the presence of both boron and phosphorus. Nevertheless, while the text of Claim 31 relates to cobalt alloys, it depends from Claim 13, which as already explained is not appropriately rejected by Inoue in view of Applicant's Admissions. Claim 31 is rejected and objected to for reasons given above. Rejections over Claims 32 and 34 by Inoue in view of Applicant's Admissions are warranted, as set forth above.

Conclusion

30. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).
31. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory


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action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

32. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael La Villa whose telephone number is (571) 272-1539. The examiner can normally be reached on Monday through Friday.
33. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

34. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael La Villa
2 March 2006


MICHAEL E. LAVILLA PH.D.
PRIMARY EXAMINER